

SEQUENCE LISTING



<110> Han, et al.

<120> HUMAN E3 ALPHA UBIQUITIN LIGASE FAMILY

<130> 01017/35966C

<140> US 10/758,636

<141> 2004-01-15

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<160> 29

<170> PatentIn version 3.2

<210> 1

<211> 6308

<212> DNA

<213> Homo sapiens

<220>

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Glu Ile Tyr Phe Ala Glu Met Asp Pro Asp Leu Glu Lys Gln Glu Glu
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Ser Val Gln Met Ser Ile Phe Thr Pro Leu Glu Trp Tyr Leu Phe Gly
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Glu Asp Pro Asp Ile Cys Leu Glu Lys Leu Lys His Ser Gly Ala Phe
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Gln Leu Cys Gly Arg Val Phe Lys Ser Gly Glu Thr Thr Tyr Ser Cys
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Arg Asp Cys Ala Ile Asp Pro Thr Cys Val Leu Cys Met Asp Cys Phe
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Gln Asp Ser Val His Lys Asn His Arg Tyr Lys Met His Thr Ser Thr
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Gly Gly Gly Phe Cys Asp Cys Gly Asp Thr Glu Ala Trp Lys Thr Gly
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Pro Phe Cys Val Asn His Glu Pro Gly Arg Ala Gly Thr Ile Lys Glu
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Asn Ser Arg Cys Pro Leu Asn Glu Glu Val Ile Val Gln Ala Arg Lys
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Ile Phe Pro Ser Val Ile Lys Tyr Val Val Glu Met Thr Ile Trp Glu
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Arg Tyr Tyr Cys Val Leu Phe Asn Asp Glu His His Ser Tyr Asp His
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Gln Leu His Thr Thr Ala Ile Asp Lys Glu Gly Arg Arg Ala Val Lys
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Ala Gly Ala Tyr Ala Ala Cys Gln Glu Ala Lys Glu Asp Ile Lys Ser
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His Ser Glu Asn Val Ser Gln His Pro Leu His Val Glu Val Leu His
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Ser Glu Ile Met Ala His Gln Lys Phe Ala Leu Arg Leu Gly Ser Trp
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Met Asn Lys Ile Met Ser Tyr Ser Ser Asp Phe Arg Gln Ile Phe Cys
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Gln Ala Cys Leu Arg Glu Glu Pro Asp Ser Glu Asn Pro Cys Leu Ile
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Ser Arg Leu Met Leu Trp Asp Ala Lys Leu Tyr Lys Gly Ala Arg Lys
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Lys Lys Leu Phe Ala Met Glu Phe Val Lys Tyr Tyr Lys Gln Leu Gln
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Lys Glu Tyr Ile Ser Asp Asp His Asp Arg Ser Ile Ser Ile Thr Ala
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Leu Ser Val Gln Met Phe Thr Val Pro Thr Leu Ala Arg His Leu Ile
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 Ser Gln Asp Lys Leu Gly Arg Val Tyr Ala Val Ile Cys Asp Leu Lys
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 Gln Phe Leu Glu Gly Phe Arg Ser Phe Leu Lys Ile Leu Thr Cys Met
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 Gln Gly Met Glu Glu Ile Arg Arg Gln Val Gly Gln His Ile Glu Val
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 Asp Pro Asp Trp Glu Ala Ala Ile Ala Ile Gln Met Gln Leu Lys Asn
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 Leu Val Ala Tyr Lys Glu Cys His Lys Ala Val Met Arg Cys Ser Thr
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 Ser Phe Ile Ser Ser Ser Lys Thr Val Val Gln Ser Cys Gly His Ser
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 Leu Glu Thr Lys Ser Tyr Arg Val Ser Glu Asp Leu Val Ser Ile His
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 Leu Pro Leu Ser Arg Thr Leu Ala Gly Leu His Val Arg Leu Ser Arg
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 Leu Gly Ala Val Ser Arg Leu His Glu Phe Val Ser Phe Glu Asp Phe
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 Gln Val Glu Val Leu Val Glu Tyr Pro Leu Arg Cys Leu Val Leu Val
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 Ala Gln Val Val Ala Glu Met Trp Arg Arg Asn Gly Leu Ser Leu Ile
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 Ser Gln Val Phe Tyr Tyr Gln Asp Val Lys Cys Arg Glu Glu Met Tyr
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Asp Lys Asp Ile Ile Met Leu Gln Ile Gly Ala Ser Leu Met Asp Pro
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Asn Lys Phe Leu Leu Leu Val Leu Gln Arg Tyr Glu Leu Ala Glu Ala
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Phe Asn Lys Thr Ile Ser Thr Lys Asp Gln Asp Leu Ile Lys Gln Tyr
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Asn Thr Leu Ile Glu Glu Met Leu Gln Val Leu Ile Tyr Ile Val Gly
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Glu Arg Tyr Val Pro Gly Val Gly Asn Val Thr Lys Glu Glu Val Thr
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Met Arg Glu Ile Ile His Leu Leu Cys Ile Glu Pro Met Pro His Ser
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Ala Ile Ala Lys Asn Leu Pro Glu Asn Glu Asn Asn Glu Thr Gly Leu
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Glu Asn Val Ile Asn Lys Val Ala Thr Phe Lys Lys Pro Gly Val Ser
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Gly His Gly Val Tyr Glu Leu Lys Asp Glu Ser Leu Lys Asp Phe Asn
 820 825 830

Met Tyr Phe Tyr His Tyr Ser Lys Thr Gln His Ser Lys Ala Glu His
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Met Gln Lys Lys Arg Arg Lys Gln Glu Asn Lys Asp Glu Ala Leu Pro
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Pro Pro Pro Pro Pro Glu Phe Cys Pro Ala Phe Ser Lys Val Ile Asn
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Arg Ala Ile Asp Thr Asp Ser Asn Leu Trp Thr Glu Gly Met Leu Gln
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Trp Ile Leu Gln Met Phe Asp Thr Val Lys Arg Leu Arg Glu Lys Ser
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Cys Leu Ile Val Ala Thr Thr Ser Gly Ser Glu Ser Ile Lys Asn Asp
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Leu Phe Met Asp Pro Asp Leu Ala Tyr Gly Thr Tyr Thr Gly Ser
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Cys Gly His Val Met His Ala Val Cys Trp Gln Lys Tyr Phe Glu
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Ala Val Gln Leu Ser Ser Gln Gln Arg Ile His Val Asp Leu Phe
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Cys	Asn	Thr	Val	Ile	Pro	Ile	Ile	Pro	Leu	Gln	Pro	Gln	Lys	Ile
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Asn	Ser	Glu	Asn	Ala	Asp	Ala	Leu	Ala	Gln	Leu	Leu	Thr	Leu	Ala
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Arg	His	Ala	Lys	Gly	Glu	Asn	Pro	Ile	Pro	Ile	Phe	Phe	Asn	Gln
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Gly	Met	Gly	Asp	Ser	Thr	Leu	Glu	Phe	His	Ser	Ile	Leu	Ser	Phe
1265						1270					1275			
Gly	Val	Glu	Ser	Ser	Ile	Lys	Tyr	Ser	Asn	Ser	Ile	Lys	Glu	Met
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Val	Ile	Leu	Phe	Ala	Thr	Thr	Ile	Tyr	Arg	Ile	Gly	Leu	Lys	Val
1295						1300					1305			
Pro	Pro	Asp	Glu	Arg	Asp	Pro	Arg	Val	Pro	Met	Leu	Thr	Trp	Ser
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Thr	Cys	Ala	Phe	Thr	Ile	Gln	Ala	Ile	Glu	Asn	Leu	Leu	Gly	Asp
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Val	Val	Leu	Pro	Asn	Ile	Lys	Ser	Glu	Asp	Thr	Pro	Cys	Leu	Leu
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Ser	Ile	Asp	Leu	Phe	His	Val	Leu	Val	Gly	Ala	Val	Leu	Ala	Phe
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Pro	Ser	Leu	Tyr	Trp	Asp	Asp	Pro	Val	Asp	Leu	Gln	Pro	Ser	Ser
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Val	Ser	Ser	Ser	Tyr	Asn	His	Leu	Tyr	Leu	Phe	His	Leu	Ile	Thr
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Met	Ala	His	Met	Leu	Gln	Ile	Leu	Leu	Thr	Val	Asp	Thr	Gly	Leu
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Pro	Leu	Ala	Gln	Val	Gln	Glu	Asp	Ser	Glu	Glu	Ala	His	Ser	Ala
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Ser	Ser	Phe	Phe	Ala	Glu	Ile	Ser	Gln	Tyr	Thr	Ser	Gly	Ser	Ile
1475						1480					1485			
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1490						1495					1500			
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Ser	His	Phe	Arg	Cys	Pro	Arg	Ser	Ala	Asp	Asp	Glu	Arg	Lys	His
1610						1615					1620			
Pro	Val	Leu	Cys	Leu	Phe	Cys	Gly	Ala	Ile	Leu	Cys	Ser	Gln	Asn
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Ile	Cys	Cys	Gln	Glu	Ile	Val	Asn	Gly	Glu	Glu	Val	Gly	Ala	Cys
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Ile	Phe	His	Ala	Leu	His	Cys	Gly	Ala	Gly	Val	Cys	Ile	Phe	Leu
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Lys Ile Arg Glu Cys Arg Val Val Leu Val Glu Gly Lys Ala Arg
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Arg Tyr Arg Lys Leu His Leu Val Trp Gln Gln His Cys Ile Ile
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 Leu Thr Arg Glu Val Tyr Gln His Leu Ala His Tyr Val Pro Lys Ile
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Arg Gln Lys Phe Leu Glu Gly Phe Asp Ala Phe Leu Glu Leu Leu Lys
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Gly His Ser Val Glu Thr Ile Arg Tyr Cys Val Ser Gln Glu Lys Val
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Gly Pro Asn Pro Phe Pro Gln Lys Glu Asp Thr Leu Ala Gln His Ile	
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Cys Asp Cys Gly Asp Thr Glu Ala Trp Lys Glu Gly Pro Tyr Cys Gln	
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Lys His Lys Leu Ser Ser Ser Glu Val Val Glu Glu Glu Asp Pro Leu	
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Val His Leu Ser Glu Asp Val Ile Ala Arg Thr Tyr Asn Ile Phe Ala	
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Glu Leu Pro Glu Asp Leu Glu Val Ala Glu Lys Ser Asp Thr Tyr Tyr	
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Cys 230	Met	Leu	Phe	Asn	Asp	Glu 235	Val	His	Thr	Tyr	Glu 240	Gln	Val	Ile	Tyr	
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Thr 245	Leu	Gln	Lys	Ala	Val	Asn 250	Cys	Thr	Gln	Lys 255	Glu	Ala	Ile	Gly	Phe 260	
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Phe	Gln	Tyr	Cys 280	Asp	Gln	Ala	Lys 285	Thr	Val	Ile	Val	Arg 290	Asn	Thr	Ser	
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Gln	Glu	Gly	Pro	Asp 345	Gly	Glu	Asn	Ser 350	Ser	Leu	Val	Asp	Arg	Leu 355	Met	
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Glu	Asp	Asp	His	Glu	Arg	Ala	Val	Ser	Val	Thr 415	Ala	Leu	Ser	Val	Gln 420	
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Phe	Phe	Thr	Ala	Pro	Thr	Leu	Ala	Arg 430	Met	Leu	Leu	Thr	Glu	Glu	Asn 435	
ctg	atg	acc	ggt	atc	att	aag	gct	ttc	atg	gac	cat	ttg	aaa	cac	aga	2121
Leu	Met	Thr 440	Val	Ile	Ile	Lys	Ala 445	Phe	Met	Asp	His	Leu 450	Lys	His	Arg	
gat	gcc	cag	ggc	aga	ttc	cag	ttt	gaa	cgc	tac	act	gcc	ctc	caa	gcc	2169
Asp	Ala	Gln	Gly	Arg	Phe	Gln	Phe 460	Glu	Arg	Tyr	Thr	Ala 465	Leu	Gln	Ala	
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Phe	Lys 470	Phe	Arg	Arg	Val	Gln 475	Ser	Leu	Ile	Leu 480	Asp	Leu	Lys	Tyr	Val	

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gct tac aag aaa tgc ctg gct gtg ctg aca cag tgt cat ggc gga ttt Ala Tyr Lys Lys Cys Leu Ala Val Leu Thr Gln Cys His Gly Gly Phe 565 570 575 580	2505
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gaa gtg gca tat aaa ttt cca gag ctc cta cct cta agt gaa ctg agc Glu Val Ala Tyr Lys Phe Pro Glu Leu Leu Pro Leu Ser Glu Leu Ser 630 635 640	2697
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Ala Glu Ala Glu	Gly Thr Ile Met	Glu Glu Ser Ser Arg	Asp Lys	
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Asp Lys Ala Glu	Arg Lys Arg Lys	Ala Glu Ile Ala Arg	Leu Arg	
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cgg gag aag atc	atg gcc cag atg	tct gag atg cag cgg	cac ttc	3933
Arg Glu Lys Ile	Met Ala Gln Met	Ser Glu Met Gln Arg	His Phe	
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Thr Ser Ala Ser	Ala Thr Leu Asp	Ser Ser Pro Pro Val	Ser Asp	
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Pro Arg Gln Phe	Val Thr Cys Ile	Leu Cys Gln Glu Glu	Gln Glu	
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Val Thr Val Gly	Ser Arg Ala Met	Val Leu Ala Ala Phe	Val Gln	
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Arg Ser Thr Val	Leu Ser Lys Asp	Arg Thr Lys Thr Ile	Ala Asp	
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Gln Gln Ile Lys Val Val Gln Met Leu Arg Arg Lys His Asn Ala	
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Lys Thr Lys Gly Cys Phe Tyr Ser Pro Pro Tyr Leu Asp Asp Tyr	
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Asp Leu Asn Arg Glu Val Tyr Gln His Leu Ala His Cys Val Pro Lys	
35 40 45	
Ile Tyr Cys Arg Gly Pro Asn Pro Phe Pro Gln Lys Glu Asp Thr Leu	
50 55 60	
Ala Gln His Ile Leu Leu Gly Pro Met Glu Trp Tyr Ile Cys Ala Glu	
65 70 75 80	
Asp Pro Ala Leu Gly Phe Pro Lys Leu Glu Gln Ala Asn Lys Pro Ser	
85 90 95	
His Leu Cys Gly Arg Val Phe Lys Val Gly Glu Pro Thr Tyr Ser Cys	
100 105 110	
Arg Asp Cys Ala Val Asp Pro Thr Cys Val Leu Cys Met Glu Cys Phe	
115 120 125	
Leu Gly Ser Ile His Arg Asp His Arg Tyr Arg Met Thr Thr Ser Gly	
130 135 140	
Gly Gly Gly Phe Cys Asp Cys Gly Asp Thr Glu Ala Trp Lys Glu Gly	
145 150 155 160	

Pro Tyr Cys Gln Lys His Lys Leu Ser Ser Ser Glu Val Val Glu Glu
 165 170 175

Glu Asp Pro Leu Val His Leu Ser Glu Asp Val Ile Ala Arg Thr Tyr
 180 185 190

Asn Ile Phe Ala Ile Met Phe Arg Tyr Ala Val Asp Ile Leu Thr Trp
 195 200 205

Glu Lys Glu Ser Glu Leu Pro Glu Asp Leu Glu Val Ala Glu Lys Ser
 210 215 220

Asp Thr Tyr Tyr Cys Met Leu Phe Asn Asp Glu Val His Thr Tyr Glu
 225 230 235 240

Gln Val Ile Tyr Thr Leu Gln Lys Ala Val Asn Cys Thr Gln Lys Glu
 245 250 255

Ala Ile Gly Phe Ala Thr Thr Val Asp Arg Asp Gly Arg Arg Pro Val
 260 265 270

Arg Tyr Gly Asp Phe Gln Tyr Cys Asp Gln Ala Lys Thr Val Ile Val
 275 280 285

Arg Asn Thr Ser Arg Gln Thr Lys Pro Leu Lys Val Gln Val Met His
 290 295 300

Ser Ser Val Ala Ala His Gln Asn Phe Gly Leu Lys Ala Leu Ser Trp
 305 310 315 320

Leu Gly Ser Val Ile Gly Tyr Ser Asp Gly Leu Arg Arg Ile Leu Cys
 325 330 335

Gln Val Gly Leu Gln Glu Gly Pro Asp Gly Glu Asn Ser Ser Leu Val
 340 345 350

Asp Arg Leu Met Leu Asn Asp Ser Lys Leu Trp Lys Gly Ala Arg Ser
 355 360 365

Val Tyr His Gln Leu Phe Met Ser Ser Leu Leu Met Asp Leu Lys Tyr
 370 375 380

Lys Lys Leu Phe Ala Leu Arg Phe Ala Lys Asn Tyr Arg Gln Leu Gln
 385 390 395 400

Arg Asp Phe Met Glu Asp Asp His Glu Arg Ala Val Ser Val Thr Ala
 405 410 415

Leu Ser Val Gln Phe Phe Thr Ala Pro Thr Leu Ala Arg Met Leu Leu
 420 425 430

Thr Glu Glu Asn Leu Met Thr Val Ile Ile Lys Ala Phe Met Asp His
 435 440 445

Leu Lys His Arg Asp Ala Gln Gly Arg Phe Gln Phe Glu Arg Tyr Thr
 450 455 460

Ala Leu Gln Ala Phe Lys Phe Arg Arg Val Gln Ser Leu Ile Leu Asp
 465 470 475 480

Leu Lys Tyr Val Leu Ile Ser Lys Pro Thr Glu Trp Ser Asp Glu Leu
 485 490 495

Arg Gln Lys Phe Leu Gln Gly Phe Asp Ala Phe Leu Glu Leu Leu Lys
 500 505 510

Cys Met Gln Gly Met Asp Pro Ile Thr Arg Gln Val Gly Gln His Ile
 515 520 525

Glu Met Glu Pro Glu Trp Glu Ala Ala Phe Thr Leu Gln Met Lys Leu
 530 535 540

Thr His Val Ile Ser Met Val Gln Asp Trp Cys Ala Leu Asp Glu Lys
 545 550 555 560

Val Leu Ile Glu Ala Tyr Lys Lys Cys Leu Ala Val Leu Thr Gln Cys
 565 570 575

His Gly Gly Phe Thr Asp Gly Glu Gln Pro Ile Thr Leu Ser Ile Cys
 580 585 590

Gly His Ser Val Glu Thr Ile Arg Tyr Cys Val Ser Gln Glu Lys Val
 595 600 605

Ser Ile His Leu Pro Ile Ser Arg Leu Leu Ala Gly Leu His Val Leu
 610 615 620

Leu Ser Lys Ser Glu Val Ala Tyr Lys Phe Pro Glu Leu Leu Pro Leu
 625 630 635 640

Ser Glu Leu Ser Pro Pro Met Leu Ile Glu His Pro Leu Arg Cys Leu
 645 650 655

Val Leu Cys Ala Gln Val His Ala Gly Met Trp Arg Arg Asn Gly Phe
 660 665 670

Ser Leu Val Asn Gln Ile Tyr Tyr Tyr His Asn Val Lys Cys Arg Arg
 675 680 685

Glu Met Phe Asp Lys Asp Ile Val Met Leu Gln Thr Gly Val Ser Met
 690 695 700

Met Asp Pro Asn His Phe Leu Met Ile Met Leu Ser Arg Phe Glu Leu
 705 710 715 720

Tyr Gln Leu Phe Ser Thr Pro Asp Tyr Gly Lys Arg Phe Ser Ser Glu
 725 730 735

Val Thr His Lys Asp Val Val Gln Gln Asn Asn Thr Leu Ile Glu Glu
 740 745 750

Met Leu Tyr Leu Ile Ile Met Leu Val Gly Glu Arg Phe Asn Pro Gly
 755 760 765

Val Gly Gln Val Ala Ala Thr Asp Glu Ile Lys Arg Glu Ile Ile His
 770 775 780

Gln Leu Ser Ile Lys Pro Met Ala His Ser Glu Leu Val Lys Ser Leu
 785 790 795 800

Pro Glu Asp Glu Asn Lys Glu Thr Gly Met Glu Ser Val Ile Glu Ser
 805 810 815

Val Ala His Phe Lys Lys Pro Gly Leu Thr Gly Arg Gly Met Tyr Glu
 820 825 830

Leu Lys Pro Glu Cys Ala Lys Glu Phe Asn Leu Tyr Phe Tyr His Phe
 835 840 845

Ser Arg Ala Glu Gln Ser Lys Ala Glu Glu Ala Gln Arg Lys Leu Lys
 850 855 860

Arg Glu Asn Lys Glu Asp Thr Ala Leu Pro Pro Pro Ala Leu Pro Pro
 865 870 875 880

Phe Cys Pro Leu Phe Ala Ser Leu Val Asn Ile Leu Gln Cys Asp Val
 885 890 895

Met Leu Tyr Ile Met Gly Thr Ile Leu Gln Trp Ala Val Glu His His
 900 905 910

Gly Ser Ala Trp Ser Glu Ser Met Leu Gln Arg Val Leu His Leu Ile
 915 920 925

Gly Met Ala Leu Gln Glu Glu Lys His His Leu Glu Asn Ala Val Glu
 930 935 940

Gly His Val Gln Thr Phe Thr Phe Thr Gln Lys Ile Ser Lys Pro Gly
 945 950 955 960

Asp Ala Pro His Asn Ser Pro Ser Ile Leu Ala Met Leu Glu Thr Leu
 965 970 975

Gln Asn Ala Pro Ser Leu Glu Ala His Lys Asp Met Ile Arg Trp Leu
 980 985 990

Leu Lys Met Phe Asn Ala Ile Lys Lys Ile Arg Glu Cys Ser Ser Ser
 995 1000 1005

Ser Pro Val Ala Glu Ala Glu Gly Thr Ile Met Glu Glu Ser Ser
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Arg Asp Lys Asp Lys Ala Glu Arg Lys Arg Lys Ala Glu Ile Ala
 1025 1030 1035

Arg Leu Arg Arg Glu Lys Ile Met Ala Gln Met Ser Glu Met Gln
 1040 1045 1050

Arg His Phe Ile Asp Glu Asn Lys Glu Leu Phe Gln Gln Thr Leu
 1055 1060 1065

Glu Leu Asp Thr Ser Ala Ser Ala Thr Leu Asp Ser Ser Pro Pro
 1070 1075 1080

Val Ser Asp Ala Ala Leu Thr Ala Leu Gly Pro Ala Gln Thr Gln
 1085 1090 1095

Val Pro Glu Pro Arg Gln Phe Val Thr Cys Ile Leu Cys Gln Glu
 1100 1105 1110

Glu Gln Glu Val Thr Val Gly Ser Arg Ala Met Val Leu Ala Ala
 1115 1120 1125

Phe Val Gln Arg Ser Thr Val Leu Ser Lys Asp Arg Thr Lys Thr
 1130 1135 1140

Ile Ala Asp Pro Glu Lys Tyr Asp Pro Leu Phe Met His Pro Asp
 1145 1150 1155

Leu Ser Cys Gly Thr His Thr Gly Ser Cys Gly His Val Met His
 1160 1165 1170

Ala	His	Cys	Trp	Gln	Arg	Tyr	Phe	Asp	Ser	Val	Gln	Ala	Lys	Glu
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Gln	Arg	Arg	Gln	Gln	Arg	Leu	Arg	Leu	His	Thr	Ser	Tyr	Asp	Val
1190						1195					1200			
Glu	Asn	Gly	Glu	Phe	Leu	Cys	Pro	Leu	Cys	Glu	Cys	Leu	Ser	Asn
1205						1210					1215			
Thr	Val	Ile	Pro	Leu	Leu	Leu	Pro	Pro	Arg	Ser	Ile	Leu	Ser	Arg
1220						1225					1230			
Arg	Leu	Asn	Phe	Ser	Asp	Gln	Pro	Asp	Leu	Ala	Gln	Trp	Thr	Arg
1235						1240					1245			
Ala	Val	Thr	Gln	Gln	Ile	Lys	Val	Val	Gln	Met	Leu	Arg	Arg	Lys
1250						1255					1260			
His	Asn	Ala	Ala	Asp	Thr	Ser	Ser	Ser	Glu	Asp	Thr	Glu	Ala	Met
1265						1270					1275			
Asn	Ile	Ile	Pro	Ile	Pro	Glu	Gly	Phe	Arg	Pro	Asp	Phe	Tyr	Pro
1280						1285					1290			
Arg	Asn	Pro	Tyr	Ser	Asp	Ser	Ile	Lys	Glu	Met	Leu	Thr	Thr	Phe
1295						1300					1305			
Gly	Thr	Ala	Ala	Tyr	Lys	Val	Gly	Leu	Lys	Val	His	Pro	Asn	Glu
1310						1315					1320			
Gly	Asp	Pro	Arg	Val	Pro	Ile	Leu	Cys	Trp	Gly	Thr	Cys	Ala	Tyr
1325						1330					1335			
Thr	Ile	Gln	Ser	Ile	Glu	Arg	Ile	Leu	Ser	Asp	Glu	Glu	Lys	Pro
1340						1345					1350			
Val	Phe	Gly	Pro	Leu	Pro	Cys	Arg	Leu	Asp	Asp	Cys	Leu	Arg	Ser
1355						1360					1365			
Leu	Thr	Arg	Phe	Ala	Ala	Ala	His	Trp	Thr	Val	Ala	Leu	Leu	Pro
1370						1375					1380			
Val	Val	Gln	Gly	His	Phe	Cys	Lys	Leu	Phe	Ala	Ser	Leu	Val	Pro
1385						1390					1395			
Ser	Asp	Ser	Tyr	Glu	Asp	Leu	Pro	Cys	Ile	Leu	Asp	Ile	Asp	Met
1400						1405					1410			

Phe	His	Leu	Leu	Val	Gly	Leu	Val	Leu	Ala	Phe	Pro	Ala	Leu	Gln
1415						1420					1425			
Cys	Gln	Asp	Phe	Ser	Gly	Ser	Ser	Leu	Ala	Thr	Gly	Asp	Leu	His
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Ile	Phe	His	Leu	Val	Thr	Met	Ala	His	Ile	Val	Gln	Ile	Leu	Leu
1445						1450					1455			
Thr	Ser	Cys	Thr	Glu	Glu	Asn	Gly	Met	Asp	Gln	Glu	Asn	Pro	Thr
1460						1465					1470			
Gly	Glu	Glu	Glu	Leu	Ala	Ile	Leu	Ser	Leu	His	Lys	Thr	Leu	His
1475						1480					1485			
Gln	Tyr	Thr	Gly	Ser	Ala	Leu	Lys	Glu	Ala	Pro	Ser	Gly	Trp	His
1490						1495					1500			
Leu	Trp	Arg	Ser	Val	Arg	Ala	Ala	Ile	Met	Pro	Phe	Leu	Lys	Cys
1505						1510					1515			
Ser	Ala	Leu	Phe	Phe	His	Tyr	Leu	Asn	Gly	Val	Pro	Ala	Pro	Pro
1520						1525					1530			
Asp	Leu	Gln	Val	Ser	Gly	Thr	Ser	His	Phe	Glu	His	Leu	Cys	Asn
1535						1540					1545			
Tyr	Leu	Ser	Leu	Pro	Thr	Asn	Leu	Ile	His	Leu	Phe	Gln	Glu	Asn
1550						1555					1560			
Ser	Asp	Ile	Met	Asn	Ser	Leu	Ile	Glu	Ser	Trp	Cys	Gln	Asn	Ser
1565						1570					1575			
Glu	Val	Lys	Arg	Tyr	Leu	Asn	Gly	Glu	Arg	Gly	Ala	Ile	Ser	Tyr
1580						1585					1590			
Pro	Arg	Gly	Ala	Asn	Lys	Leu	Ile	Asp	Leu	Pro	Glu	Asp	Tyr	Ser
1595						1600					1605			
Ser	Leu	Ile	Asn	Gln	Ala	Ser	Asn	Phe	Ser	Cys	Pro	Lys	Ser	Gly
1610						1615					1620			
Gly	Asp	Lys	Ser	Arg	Ala	Pro	Thr	Leu	Cys	Leu	Val	Cys	Gly	Ser
1625						1630					1635			
Leu	Leu	Cys	Ser	Gln	Ser	Tyr	Cys	Cys	Gln	Ala	Glu	Leu	Glu	Gly
1640						1645					1650			

Glu Asp Val Gly Ala Cys Thr Ala His Thr Tyr Ser Cys Gly Ser
1655 1660 1665

Gly Ala Gly Ile Phe Leu Arg Val Arg Glu Cys Gln Val Leu Phe
1670 1675 1680

Leu Ala Gly Lys Thr Lys Gly Cys Phe Tyr Ser Pro Pro Tyr Leu
1685 1690 1695

Asp Asp Tyr Gly Glu Thr Asp Gln Gly Leu Arg Arg Gly Asn Pro
1700 1705 1710

Leu His Leu Cys Gln Glu Arg Phe Arg Lys Ile Gln Lys Leu Trp
1715 1720 1725

Gln Gln His Ser Ile Thr Glu Glu Ile Gly His Ala Gln Glu Ala
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Asn Gln Thr Leu Val Gly Ile Asp Trp Gln His Leu
1745 1750 1755

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24

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Val Asp Phe Tyr Thr Ala Phe Leu His His Leu Ala Gln Leu Val Pro
35 40 45

Glu Ile Tyr Phe Ala Glu Met Asp Pro Asp Leu Glu Lys Gln Glu Glu
50 55 60

Ser Val Gln Met Ser Ile Leu Thr Pro Leu Glu Trp Tyr Leu Phe Gly
65 70 75 80

Glu Asp Pro Asp Ile Cys Leu Glu Lys Leu Lys His Ser Gly Ala Phe
85 90 95

Gln Leu Cys Gly Lys Val Phe Lys Ser Gly Glu Thr Thr Tyr Ser Cys
100 105 110

Arg Asp Cys Ala Ile Asp Pro Thr Cys Val Leu Cys Met Asp Cys Phe
115 120 125

Gln Ser Ser Val His Lys Asn His Arg Tyr Lys Met His Thr Ser Thr
130 135 140

Gly Gly Gly Phe Cys Asp Cys Gly Asp Thr Glu Ala Trp Lys Thr Gly
145 150 155 160

Pro Phe Cys Val Asp His Glu Pro Gly Arg Ala Gly Thr Thr Lys Glu
165 170 175

Ser Leu His Cys Pro Leu Asn Glu Glu Val Ile Ala Gln Ala Arg Arg
180 185 190

Ile Phe Pro Ser Val Ile Lys Tyr Ile Val Glu Met Thr Ile Trp Glu
195 200 205

Glu Glu Lys Glu Leu Pro Pro Glu Leu Gln Ile Arg Glu Lys Asn Glu
210 215 220

Arg Tyr Tyr Cys Val Leu Phe Asn Asp Glu His His Ser Tyr Asp His

225		230		235		240
Val Ile Tyr Ser	Leu Gln Arg Ala Leu Asp Cys Glu Leu Ala Glu Ala					
	245			250		255
Gln Leu His Thr Thr Ala Ile Asp Lys Glu Gly Arg Arg Ala Val Lys						
	260			265		270
Ala Gly Val Tyr Ala Thr Cys Gln Glu Ala Lys Glu Asp Ile Lys Ser						
	275			280		285
His Ser Glu Asn Val Ser Gln His Pro Leu His Val Glu Val Leu His						
	290			295		300
Ser Val Val Met Ala His Gln Lys Phe Ala Leu Arg Leu Gly Ser Trp						
	305			310		315
Met Asn Lys Ile Met Ser Tyr Ser Ser Asp Phe Arg Gln Ile Phe Cys						
	325			330		335
Gln Ala Cys Leu Val Glu Glu Pro Gly Ser Glu Asn Pro Cys Leu Ile						
	340			345		350
Ser Arg Leu Met Leu Trp Asp Ala Lys Leu Tyr Lys Gly Ala Arg Lys						
	355			360		365
Ile Leu His Glu Leu Ile Phe Ser Ser Phe Phe Met Glu Met Glu Tyr						
	370			375		380
Lys Lys Leu Phe Ala Met Glu Phe Val Lys Tyr Tyr Lys Gln Leu Gln						
	385			390		395
Lys Glu Tyr Ile Ser Asp Asp His Glu Arg Ser Ile Ser Ile Thr Ala						
	405			410		415
Leu Ser Val Gln Met Leu Thr Val Pro Thr Leu Ala Arg His Leu Ile						
	420			425		430
Glu Glu Gln Asn Val Ile Ser Val Ile Thr Glu Thr Leu Leu Glu Val						
	435			440		445
Leu Pro Glu Tyr Leu Asp Arg Asn Asn Lys Phe Asn Phe Gln Gly Tyr						
	450			455		460
Ser Gln Asp Lys Leu Gly Arg Val Tyr Ala Val Ile Cys Asp Leu Lys						
	465			470		475
						480

Tyr Ile Leu Ile Ser Lys Pro Val Ile Trp Thr Glu Arg Leu Arg Ala
 485 490 495

Gln Phe Leu Glu Gly Phe Arg Ser Phe Leu Lys Ile Leu Thr Cys Met
 500 505 510

Gln Gly Met Glu Glu Ile Arg Arg Gln Val Gly Gln His Ile Glu Val
 515 520 525

Asp Pro Asp Trp Glu Ala Ala Ile Ala Ile Gln Met Gln Leu Lys Asn
 530 535 540

Ile Leu Leu Met Phe Gln Glu Trp Cys Ala Cys Asp Glu Asp Leu Leu
 545 550 555 560

Leu Val Ala Tyr Lys Glu Cys His Lys Ala Val Met Arg Cys Ser Thr
 565 570 575

Asn Phe Met Ser Ser Thr Lys Thr Val Val Gln Leu Cys Gly His Ser
 580 585 590

Leu Glu Thr Lys Ser Tyr Lys Val Ser Glu Asp Leu Val Ser Ile His
 595 600 605

Leu Pro Leu Ser Arg Thr Leu Ala Gly Leu His Val Arg Leu Ser Arg
 610 615 620

Leu Gly Ala Ile Ser Arg Leu His Glu Phe Val Pro Phe Asp Ser Phe
 625 630 635 640

Gln Val Glu Val Leu Val Glu Tyr Pro Leu Arg Cys Leu Val Leu Val
 645 650 655

Ala Gln Val Val Ala Glu Met Trp Arg Arg Asn Gly Leu Ser Leu Ile
 660 665 670

Ser Gln Val Phe Tyr Tyr Gln Asp Val Lys Cys Arg Glu Glu Met Tyr
 675 680 685

Asp Lys Asp Ile Ile Met Leu Gln Ile Gly Ala Ser Ile Met Asp Pro
 690 695 700

Asn Lys Phe Leu Leu Leu Val Leu Gln Arg Tyr Glu Leu Thr Asp Ala
 705 710 715 720

Phe Asn Lys Thr Ile Ser Thr Lys Asp Gln Asp Leu Ile Lys Gln Tyr
 725 730 735

Asn Thr Leu Ile Glu Glu Met Leu Gln Val Leu Ile Tyr Ile Val Gly
 740 745 750

Glu Arg Tyr Val Pro Gly Val Gly Asn Val Thr Arg Glu Glu Val Ile
 755 760 765

Met Arg Glu Ile Thr His Leu Leu Cys Ile Glu Pro Met Pro His Ser
 770 775 780

Ala Ile Ala Arg Asn Leu Pro Glu Asn Glu Asn Asn Glu Thr Gly Leu
 785 790 795 800

Glu Asn Val Ile Asn Lys Val Ala Thr Phe Lys Lys Pro Gly Val Ser
 805 810 815

Gly His Gly Val Tyr Glu Leu Lys Asp Glu Ser Leu Lys Asp Phe Asn
 820 825 830

Met Tyr Phe Tyr His Tyr Ser Lys Thr Gln His Ser Lys Ala Glu His
 835 840 845

Met Gln Lys Lys Arg Arg Lys Gln Glu Asn Lys Asp Glu Ala Leu Pro
 850 855 860

Pro Pro Pro Pro Pro Glu Phe Cys Pro Ala Phe Ser Lys Val Val Asn
 865 870 875 880

Leu Leu Ser Cys Asp Val Met Ile Tyr Ile Leu Arg Thr Ile Phe Glu
 885 890 895

Arg Ala Val Asp Thr Glu Ser Asn Leu Trp Thr Glu Gly Met Leu Gln
 900 905 910

Met Ala Phe His Ile Leu Ala Leu Gly Leu Leu Glu Glu Lys Gln Gln
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Leu Gln Lys Ala Pro Glu Glu Glu Val Ala Phe Asp Phe Tyr His Lys
 930 935 940

Ala Ser Arg Leu Gly Ser Ser Ala Met Asn Ala Gln Asn Ile Gln Met
 945 950 955 960

Leu Leu Glu Arg Leu Lys Gly Ile Pro Gln Leu Glu Gly Gln Lys Asp
 965 970 975

Met Ile Thr Trp Ile Leu Gln Met Phe Asp Thr Val Lys Arg Leu Arg
 980 985 990

Glu Lys Ser Cys Leu Val Val Ala Thr Thr Ser Gly Leu Glu Cys Ile
 995 1000 1005

Lys Ser Glu Glu Ile Thr His Asp Lys Glu Lys Ala Glu Arg Lys
 1010 1015 1020

Arg Lys Ala Glu Ala Ala Arg Leu His Arg Gln Lys Ile Met Ala
 1025 1030 1035

Gln Met Ser Ala Leu Gln Lys Asn Phe Ile Glu Thr His Lys Leu
 1040 1045 1050

Met Tyr Asp Asn Thr Ser Glu Val Thr Gly Lys Glu Asp Ser Ile
 1055 1060 1065

Met Glu Glu Glu Ser Thr Ser Ala Val Ser Glu Ala Ser Arg Ile
 1070 1075 1080

Ala Leu Gly Pro Lys Arg Gly Pro Ala Val Thr Glu Lys Glu Val
 1085 1090 1095

Leu Thr Cys Ile Leu Cys Gln Glu Glu Gln Glu Val Lys Leu Glu
 1100 1105 1110

Asn Asn Ala Met Val Leu Ser Ala Cys Val Gln Lys Ser Thr Ala
 1115 1120 1125

Leu Thr Gln His Arg Gly Lys Pro Val Asp His Leu Gly Glu Thr
 1130 1135 1140

Leu Asp Pro Leu Phe Met Asp Pro Asp Leu Ala His Gly Thr Tyr
 1145 1150 1155

Thr Gly Ser Cys Gly His Val Met His Ala Val Cys Trp Gln Lys
 1160 1165 1170

Tyr Phe Glu Ala Val Gln Leu Ser Ser Gln Gln Arg Ile His Val
 1175 1180 1185

Asp Leu Phe Asp Leu Glu Ser Gly Glu Tyr Leu Cys Pro Leu Cys
 1190 1195 1200

Lys Ser Leu Cys Asn Thr Val Ile Pro Ile Ile Pro Leu Gln Pro
 1205 1210 1215

Gln Lys Ile Asn Ser Glu Asn Ala Glu Ala Leu Ala Gln Leu Leu
 1220 1225 1230

Thr	Leu	Ala	Arg	Trp	Ile	Gln	Thr	Val	Leu	Ala	Arg	Ile	Ser	Gly
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Tyr	Asn	Ile	Lys	His	Ala	Lys	Gly	Glu	Ala	Pro	Ala	Val	Pro	Val
1250						1255					1260			
Leu	Phe	Asn	Gln	Gly	Met	Gly	Asp	Ser	Thr	Phe	Glu	Phe	His	Ser
1265						1270					1275			
Ile	Leu	Ser	Phe	Gly	Val	Gln	Ser	Ser	Val	Lys	Tyr	Ser	Asn	Ser
1280						1285					1290			
Ile	Lys	Glu	Met	Val	Ile	Leu	Phe	Ala	Thr	Thr	Ile	Tyr	Arg	Ile
1295						1300					1305			
Gly	Leu	Lys	Val	Pro	Pro	Asp	Glu	Leu	Asp	Pro	Arg	Val	Pro	Met
1310						1315					1320			
Met	Thr	Trp	Ser	Thr	Cys	Ala	Phe	Thr	Ile	Gln	Ala	Ile	Glu	Asn
1325						1330					1335			
Leu	Leu	Gly	Asp	Glu	Gly	Lys	Pro	Leu	Phe	Gly	Ala	Leu	Gln	Asn
1340						1345					1350			
Arg	Gln	His	Ser	Gly	Leu	Lys	Ala	Leu	Met	Gln	Phe	Ala	Val	Ala
1355						1360					1365			
Gln	Arg	Ala	Thr	Cys	Pro	Gln	Val	Leu	Ile	His	Lys	His	Leu	Ala
1370						1375					1380			
Arg	Leu	Leu	Ser	Val	Ile	Leu	Pro	Asn	Leu	Gln	Ser	Glu	Asn	Thr
1385						1390					1395			
Pro	Gly	Leu	Leu	Ser	Val	Asp	Leu	Phe	His	Val	Leu	Val	Gly	Ala
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Val	Leu	Ala	Phe	Pro	Ser	Leu	Tyr	Trp	Asp	Asp	Thr	Val	Asp	Leu
1415						1420					1425			
Gln	Pro	Ser	Pro	Leu	Ser	Ser	Ser	Tyr	Asn	His	Leu	Tyr	Leu	Phe
1430						1435					1440			
His	Leu	Ile	Thr	Met	Ala	His	Met	Leu	Gln	Ile	Leu	Leu	Thr	Thr
1445						1450					1455			
Asp	Thr	Asp	Leu	Ser	Pro	Gly	Pro	Pro	Leu	Ala	Glu	Gly	Glu	Glu
1460						1465					1470			

Asp	Ser	Glu	Glu	Ala	Arg	Cys	Ala	Ser	Ala	Phe	Phe	Val	Glu	Val
1475						1480					1485			
Ser	Gln	His	Thr	Asp	Gly	Leu	Thr	Gly	Cys	Gly	Ala	Pro	Gly	Trp
1490						1495					1500			
Tyr	Leu	Trp	Leu	Ser	Leu	Arg	Asn	Gly	Ile	Thr	Pro	Tyr	Leu	Arg
1505						1510					1515			
Cys	Ala	Ala	Leu	Leu	Phe	His	Tyr	Leu	Leu	Gly	Val	Ala	Pro	Pro
1520						1525					1530			
Glu	Glu	Leu	Phe	Ala	Asn	Ser	Ala	Glu	Gly	Glu	Phe	Ser	Ala	Leu
1535						1540					1545			
Cys	Ser	Tyr	Leu	Ser	Leu	Pro	Thr	Asn	Leu	Phe	Leu	Leu	Phe	Gln
1550						1555					1560			
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Asn Pro Leu His Leu Ser Arg Glu Arg Tyr Arg Lys Leu His Leu
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Val Trp Gln Gln His Cys Ile Ile Glu Glu Ile Ala Arg Ser Gln
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Ala Gln Leu Val Pro Glu Ile Tyr Phe Ala Glu Met Asp Pro Asp Leu
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Glu Lys Gln Glu Glu Ser Val Gln Met Ser Ile Phe Thr Pro Leu Glu
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Trp Tyr Leu Phe Gly Glu Asp Pro Asp Ile Cys Leu Glu Lys Leu Lys
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His Ser Gly Ala Phe Gln Leu Cys Gly Arg Val Phe Lys Ser Gly Glu
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Thr Thr Tyr Ser Cys Arg Asp Cys Ala Ile Asp Pro Thr Cys Val Leu
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Cys Met Asp Cys Phe Gln Asp Ser Val His Lys Asn His Arg Tyr Lys
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Ala Trp Lys Thr Gly Pro Phe Cys Val Asn His Glu Pro Gly Arg Ala
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Val Gln Ala Arg Lys Ile Phe Pro Ser Val Ile Lys Tyr Val Val Glu
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Met Thr Ile Trp Glu Glu Glu Lys Glu Leu Pro Pro Glu Leu Gln Ile
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Arg Glu Lys Asn Glu Arg Tyr Tyr Cys Val Leu Phe Asn Asp Glu His
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His Ser Tyr Asp His Val Ile Tyr Ser Leu Gln Arg Ala Leu Asp Cys
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Arg Arg Ala Val Lys Ala Gly Ala Tyr Ala Ala Cys Gln Glu Ala Lys
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Glu Asp Ile Lys Ser His Ser Glu Asn Val Ser Gln His Pro Leu His
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Lys Gly Ala Arg Lys Ile Leu His Glu Leu Ile Phe Ser Ser Phe Phe
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Met Glu Met Glu Tyr Lys Lys Leu Phe Ala Met Glu Phe Val Lys Tyr
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Tyr Lys Gln Leu Gln Lys Glu Tyr Ile Ser Asp Asp His Asp Arg Ser
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Ile Ser Ile Thr Ala Leu Ser Val Gln Met Phe Thr Val Pro Thr Leu
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Ala Arg His Leu Ile Glu Glu Gln Asn Val Ile Ser Val Ile Thr Glu
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1685 1690 1695

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